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DEATH AND DIVORCE: THE LONG-TERM CONSEQUENCES OF PARENTAL LOSS ON ADOLESCENTS*

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ABSTRACT

Two quasi-experiments are used to estimate the impact of parental divorce on the adult incomes and labour market behaviour of adolescents, as well as on their use of social programs, and their marital/fertility behaviour. These involve the use of individuals experiencing the death of a parent, and legislative changes to the Canadian divorce law in 1986. Parental loss by death is assumed to be exogenous; the experiences of children with a bereaved background offering a benchmark to assess the endogeneity of parental loss through divorce. Differences between individuals with divorced parents and those from intact and bereaved families significantly overstate the impact of divorce across a broad range of outcomes. When background characteristics are controlled for—most notably the income and labour market activity of parents in the years leading up to the divorce—parental divorce seems to influence the marital decisions of adolescents, but not their labour market outcomes. Adolescents whose parents divorced tend to put off marriage, and once married suffer a greater likelihood of marital instability, but their earnings and incomes are not on average much different from others.

KEYWORDS: Intergenerational mobility; Divorce; Children; Quasi-Experimental Design.
JEL CODES : J12, J62, C23

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DEATH AND DIVORCE: THE LONG-TERM CONSEQUENCES OF PARENTAL LOSS ON ADOLESCENTS

The relationship between familial background and the capacity of children to become self-reliant adults is a central element in the appropriate design of policies ranging from income distribution to family law. Yet we know surprising little about how intergenerational processes work to determine the long-term attainments of children. In a sweeping review of the U.S. literature Haveman and Wolfe (1995) point out that it is difficult to establish the causal patterns at work because unobserved processes may jointly determine family structure and children's outcomes. This is particularly so in analyses dealing with the impact of parental divorce on children. For example, McLanahan and Sandefur offer a thorough examination of the topic, but begin by noting that it is very difficult to determine if children who grow up with only one parent would have done better if their parents had not divorced (1994, pp. 9-11). As a result analysts are often forced to address a less demanding, and perhaps less meaningful question: do children from divorced families do as well on average as children from intact families with similar observable characteristics? In such a context it is easy to overstate the impact of divorce, and in fact, Cherlin *et al.* (1991) using longitudinal surveys point out that "a substantial portion of what is usually considered the effect of divorce on children is visible before the parents separate" (p. 1386).

While there have been attempts to overcome difficulties associated with the endogeneity of parental divorce by using instrumental variables and sibling information from longitudinal surveys (Lang and Zagorsky 1999, Sandefur and Wells 1997), many observers

may share the pessimistic view of McLanahan and Sandefur who state that “[w]ithout a randomized experiment, we can never rule out the possibility that some other variable is causing both family structure and children’s [outcomes]... Because of this analysts will always disagree about whether family structure plays a *causal* role in determining child well-being.” (1994, p.11, emphasis in original)

While a true social experiment is obviously not possible, “quasi-experimental” methods are feasible. This approach, which is long-established in psychology and has gained a certain currency in the economics literature, is described and reviewed by Meyer (1995). A quasi-experiment involves the identification of exogenous changes in explanatory variables that influence comparable groups in different ways, usually as the result of changes in legislation. I examine the impact of parental divorce on the adult attainments of adolescents by adopting this methodology. The methods and data employed are outlined in the first two sections of the paper. Two quasi-experiments are described. They both involve the use of multiple treatment groups. The outcomes of those experiencing parental loss through both divorce and death are compared with the outcomes of those from intact families. Parental loss through death is assumed to be less correlated with unobserved attributes of family background than parental loss through divorce. As a result the group of individuals from bereaved families represent a benchmark from which to judge the endogeneity of divorce. The second quasi-experiment relies on legislative changes to the Canadian Divorce Act that came into law during 1986, and uses multiple treatment groups in a before and after design. These changes, which eliminated the need to prove fault as grounds for divorce, were intended to make divorce a less adversarial experience and to reduce the stress to which children were exposed. As such they offer exogenous variation in unobservable variables associated with the quality of the time investments parents make in children. I argue that these quasi-experiments

permit a more accurate estimate of the true effect of divorce on the attainments of children. The results using difference-in-differences estimators and Canadian administrative data are presented in section 3.

Amato (1993) among others notes the importance of comparing the experiences of children with a bereaved background to those with a divorced background. However, many of the studies attempting comparisons of this sort are limited in their relevance because of small sample sizes, usually less than 100 children. A couple of exceptions include Fronstin, Greenberg, and Robbins (1999) and Lang and Zagorsky (1999). However, while Fronstin *et al.* do incorporate information on those from bereaved families they do not explicitly view these individuals as offering the basis for an assessment of the endogeneity of divorce. Lang and Zagorsky focus on this issue, treating parental death as an instrumental variable for parental loss. Their paper is closest in spirit to my research.

One of the contributions of my paper is to use administrative data from income tax records that offer much larger sample sizes—measured in the thousands—to address this issue. The findings suggest that raw differences between children from divorced families and those from intact families significantly overstate the detrimental impact of divorce across a wide range of outcomes, and in particular that it is important to control for parental labour market behaviour and income in the years before a divorce takes place. In general, the impact of parental divorce on the adult labour market outcomes of adolescents is limited, but it does have important consequences for some aspects of social behaviour. Specifically, it is found that parental divorce lowers the adult incomes and earnings of sons, but on average only by about three percent. The incomes and earnings of daughters do not seem to be influenced. In contrast both men and women have a greater tendency to rely upon social programs, specifically Income Assistance. But this probably goes hand in hand with the finding that the

most significant consequence of parental divorce is to raise the probability that children will in turn experience marital instability. Men and women from divorced families are more likely to put off marriage, and once married more likely to experience separation and divorce.

1. Methods

I examine a host of outcomes for a group of young adolescents—dealing with labour market success, reliance on social programs, as well as marital behaviour—and relate these to their family background using a quasi-experimental framework with multiple treatment groups. The analysis proceeds through three steps. First, an examination of differences and difference-in-differences with multiple treatment groups; second, a similar examination but with controls for background characteristics; and finally, an assessment of unobservables relying upon legislative changes to the Divorce Act, and using difference-in-differences with a before-after design.

Adolescents from both bereaved and divorced families are considered as treatment groups, each group having experienced parental loss. If Y_{ijk} is an outcome measure of interest for individual i , and if j and k indicate the family type (divorced and bereaved), then let

$$Y_{ijk} = \alpha + \beta_1 d_{ij} + \beta_2 d_{ik} + \epsilon_i \quad (1)$$

where all the variables are measured at the individual level, α , β_1 , β_2 are coefficients to be estimated, and where d_{ij} and d_{ik} are binary variables taking the value of 1 if the individual was from respectively a divorced or a bereaved family, and a value of 0 otherwise. The difference in the average outcome between those children whose parents divorced and those whose families stayed together is $(\bar{Y}_{10} - \bar{Y}_{00}) = (\alpha + \beta_1) - \alpha$, or just β_1 . Similarly the differences between individuals from bereaved and intact families is $(\bar{Y}_{01} - \bar{Y}_{00}) = \beta_2$.

The objective of the analysis is to obtain an accurate estimate of β_1 for each of the outcomes under study. However, if d_{ij} is correlated with ε_i then the estimate of β_1 from the simple framework of equation (1) will be biased. This is likely to be so. Children with disadvantaged backgrounds are likely to have inferior adult outcomes. However, they are probably more likely to also have parents who divorced, so that the estimate of β_1 will overstate the true value. At the same time, however, it is also likely that parental loss because of death is not as correlated with these omitted characteristics implying that β_2 is unbiased, or at least less biased. The estimate of this coefficient is taken as a benchmark from which to judge the extent of the bias in β_1 . Indeed, in the extreme I assume that d_{ik} is not correlated with ε_i at all, implying that parental death is exogenous.¹

If both parental divorce and death are exogenous and occur randomly across the population it might be expected that the detrimental effects of parental loss on the outcomes of children would be the same regardless of the reason for the loss. In the case of perfectly comparable control and treatment groups the difference in means between individuals from both bereaved and divorced families and the group of children from intact families is an appropriate estimator of the impact of the intervention. The difference-in-differences estimator, $(\bar{Y}_{10} - \bar{Y}_{00}) - (\bar{Y}_{01} - \bar{Y}_{00}) = \beta_1 - \beta_2$, will control for any common differences between on the one hand bereaved and divorced families, and on the other hand intact families. A

¹ It can certainly be argued that death is not a completely exogenous event, and that some of the factors that determine it may also play a role in determining the adult outcomes of children. To offer only one example, education is correlated with activities such as smoking that may raise the probability of death (Millar 1996). At the same time parental education and the occupational choice and earnings of children are also correlated.

difference that is insignificantly different from zero might be taken as evidence that divorce, like death, is an exogenous event, and its impact accurately represented by β_1 .²

Alternatively, a difference-in-differences estimate that is not zero could indicate several things. The first has to do with the possibility that children from bereaved families are not completely comparable to those from divorced families. The incidence of these events may not be random across the population. For example, individuals working in particular industries and occupations, or generally those with lower incomes, face a greater risk of death. While it may also be that divorce is more likely in certain situations than others, these may not be exactly same. This possibility calls for the use of background variables to control for any differences in the composition of the two groups so that

$$Y_{ijk} = \alpha + \beta_1 d_{ij} + \beta_2 d_{ik} + \beta \mathbf{X}_i + \varepsilon_i \quad (2)$$

is the appropriate model under the assumption that the vector of background variables, \mathbf{X}_i , have the same coefficients across all three groups. I therefore offer estimates of both model (1) and (2). The impact of parental loss is determined by the extent to which β_1 and β_2 are significantly different from zero. Further, a difference between them that is not statistically significant from zero (either in model (1) or (2)) may be interpreted as evidence that divorce is exogenous (or rather at least as exogenous as death), and its impact accurately given by the estimate of β_1 .

However, β_1 and β_2 could continue to differ despite the use of a set of controls for two reasons: (1) the controls are not complete; (2) suffering bereavement and experiencing parental divorce are not equivalent events. Considering the latter, McLanahan and Sandefur

² In fact, this is a slight abuse of the “difference-in-differences” terminology. Simply put, the concern is with testing the null hypothesis that $\beta_1 - \beta_2 = 0$.

(1994, p. 66) suggest that the death of a parent may not involve as many changes for children as parental loss through separation or divorce. There may be less of a tendency for children from bereaved families to have to deal with residential moves if widowed parents face less of a drop in income than divorced parents. This may happen, for example, when life insurance is more of a compensation for parental death than support payments are for parental divorce. It may also be that the two types of loss unleash a different process depending upon the nature of the outcome being examined. For example, parental divorce may change a child's perception of the value of marriage or the risks associated with it; something that need not be the case for those experiencing the death of a parent.³

This issue aside, β_1 may continue to differ from β_2 if parental divorce is correlated with unmeasured attributes not captured by the vector of controls and that differ across the two groups. More specifically, this may be a reflection of the non-money investments that parents make in children. One interpretation, following Becker (1991), is to suggest that when a marriage is breaking up the parents are less able to invest as much time in their children. As a result, their children's human capital will not be as developed and they will experience inferior adult outcomes. A different, but essentially equivalent interpretation can be found in the sociology literature. For example, Amato (1993) describes five different theoretical perspectives and a host of associated testable hypotheses, but the most pertinent perspective for present purposes is the "Interparental Conflict" model. This perspective stresses that "conflict between parents prior to and during the dissolution process is responsible for the

³ Alternatively, it may also be that the stress associated with experiencing the death of a parent has long-term consequences for some adolescents. As Lang and Zagorsky (1999, p.10) point out, if this is the case it may be that parental loss does not have a long-term impact on children, even if parental death is associated with inferior outcomes relative to a comparable group from intact families and even if as a result the impact is similar to the impact of divorce.

lowered well-being of children of divorce.” (Amato 1993, p.30) As such it is not divorce *per se* that determines the outcomes of children, but the stress and conflict associated with an unhappy home life. Children may be drawn into the conflict between parents, and may not as a result learn the skills needed for the appropriate resolution of differences and building of relationships. This would appear to be another way of saying that the quantity and quality of the time parents invest in their children is what matters. Assuming that parental death does not involve conflict,⁴ it may be hypothesised that there will be differences between children from divorced and bereaved families who on average lived with both biological parents for the same time, with the former faring worse.⁵

A complete list of controls that includes direct measures of the amount of parental time investments or of the stress children have experienced is rarely available to analysts, but some variables introduced to control for compositional differences between the groups may nonetheless be capturing a part of the underlying process. Parental income levels and fluctuations in parental incomes are important correlates of the income and earnings prospects of children, but at the same time it is easy to imagine that they may also be related to the amount of stress the family faces and also the probability of divorce. For example, in

⁴ In Canada the annual rate of spousal homicide is about 11 wives and 3 husbands per million couples. This includes legally married, common-law, and separated relationships. The rate declines with age. See Statistics Canada (1999. pp.35-6).

⁵ Amato (1993) also describes a “Parental Loss” model in which it is assumed that a two-parent family is generally a better environment for children as each parent represents an important resource, contributing in their own way to the family’s social capital. The presence of two adults offers not only greater practical and emotional support, but also the development of a full range of role models from which to learn social and labour market skills. The absence of a parent diminishes the children’s socialization, as well as access to resources and networks that could be of value later in life. (In this sense children from divorced families may even do better than those from bereaved families because they may retain some contact with their fathers.) What is emphasized in this perspective is the absence of the parent, rather than the reason for the absence. Therefore, children who experience parental divorce will have a lower level of well-being than their counterparts from intact families, but a similar level to those from bereaved families. In one sense, this parental loss effect might be considered to be what I am calling the “true” or unbiased effect of divorce, and is measured by β_2 .

situations where the male has been the major provider for the family the loss of a secure job followed by a period of long-term unemployment may trigger a chain of events that expose children to more stress, and lead to divorce. In this case lower levels of incomes, and perhaps just the change in income, represent important proxies for the kind of control variables called for by the Interparental Conflict model. Even so it is unlikely that unobservables associated with the quantity and quality of time investments made by parents in their children are completely captured by these sorts of observable variables.

It is also possible to assess whether the set of controls available in my analysis are complete—and therefore whether any remaining differences between the estimated values of β_1 and β_2 from equation (2) should be viewed as substantive differences—by examining the impact of some important changes to the Canadian Divorce Act introduced in 1986. In essence these changes eliminated “fault” grounds for divorce. It was felt that the process associated with establishing fault heightened the conflict between spouses rather than encouraging co-operation, and that as a result it fell short of protecting the rights and interests of children. A quasi-experiment designed around these changes permits exogenous variation in the amount of stress faced by children of divorcing parents, and can be used to assess the robustness of any differences between them and their counterparts with bereaved backgrounds.

The Divorce Act as it existed up to mid-1986 placed an emphasis on the fault of a spouse for the marriage’s failure. It was also vague about the rights of children. There were two grounds for divorce: fault, and marriage breakdown. A divorce could be granted on the principle of fault if one spouse was found to have committed a “matrimonial offence.”⁶ A divorce based on these grounds could be granted as soon as the courts had time to deal with

⁶ These offences were defined in the legislation and included adultery, physical or mental cruelty, sodomy, and bestiality.

the case. In contrast divorces based on marital breakdown took much longer. A divorce on these grounds required the spouses to be living apart from each other, the length of time required before applying for a divorce varying from three to five years. (The notion of “fault” continued to play a part in determining this.) Even when a couple decided to separate by mutual consent, that is without any implication of fault, a separation of three years was required before divorce could be granted. Describing the process the Minister of Justice stated:

If a spouse wants to avoid using fault grounds altogether, a separation period of three to five years must be endured to “prove” that the marriage is beyond repair. In effect, there is a penalty for *not* using fault grounds. The penalty is arbitrary and encourages those considering divorce to fabricate fault grounds. Most divorce actions are uncontested and involve some form of agreement between the spouses at the time of the trial. In many cases, assertions of “fault” may be made simply to comply with the law, which does not allow for a more straightforward divorce by consent. (1984, p.7, emphasis in the original)

New legislation was needed because the tendency to fabricate fault grounds in order to obtain a quicker divorce was putting the legitimacy of the law into question. As described in a 1984 discussion paper, under the new Act marriage breakdown would be the sole grounds for divorce and “could be invoked when: a) both spouses assert that their marriage has broken down and they agree to a divorce. In this case, a divorce would be granted one year after the petition is made, or; b) either spouse applies for a divorce, and the spouses have been living apart for one year before, or after, the application is filed.” (Minister of Justice 1984, p. 31)

The proposals would also drop the requirement of a formal trial, and allow out of court procedures if the divorce was not contested. New legislation, however, was also needed to clarify the rights of the children and base divorce cases on their interests. It was explicitly argued that by removing the adversarial nature of divorce procedures the new law would reduce the stress faced by children and help minimize the negative impact on their well-being.

The circulation of these proposals had a significant short-term impact on the divorce rate in Canada as couples who previously would have fabricated fault grounds postponed their divorces to take place under the new Act. Figure 1 charts the divorce rate in Canada (per 100,000 legally married couples) from 1981 to 1995. Overall there is little trend in the data, the rate in the first half of the 1990s being about the same as during the early 1980s. However, the most notable development is the sharp increase in divorces between 1985 and 1987. The number of divorces in 1985 was 61,976 (the lowest since 1979), but in 1987 it was 96,200, an increase of more than 55%. This increase and the associated drop between 1984 and 1985 are due to the anticipation of the new Act. The release of the white paper outlining the proposed changes to the Divorce Act in 1984 was followed by the introduction of legislation to the House of Commons on May 1, 1985, which in turn received Royal Assent on February 13, 1986 and was proclaimed into law on June 1, 1986. Thus, it is reasonable to believe that the proposed changes were anticipated in advance, and led many couples to postpone initiating divorce proceedings.

This postponement effect is the basis for a quasi-experiment used to control for the stress to which children have been exposed. The couples postponing divorce proceedings in 1985 in anticipation of the new law were those who wanted a quick divorce, and who did not have sufficient grounds to base divorce proceedings under the fault provisions of the old Act. They are the couples who would have had a tendency to fabricate a fault ground for divorce. Therefore the divorces that actually took place in 1985 might be considered to be on average more stressful for the family than those in 1987. These would be the cases in which the process either went on a lot longer, passed through the adversarial process engendered by the old legislation, or cases in which there actually was fault as defined by the legislation. Divorces granted in previous years also probably occurred with less stress since a larger

proportion of divorces in 1983, just before the public discussion of the new law, were likely based on fabricated fault grounds. Thus, it might be expected that on average children whose parents divorced in 1987 experienced less stress than those whose parents divorced in 1985, with those whose parents divorced in 1983 experiencing an intermediate level.

This suggests that the outcomes of children should vary according to the year of parental divorce, and can be modelled in a before-after design with multiple treatment groups as a series of interaction terms between an indicator for divorce and time. Adding indicators for time to control for cohort effects, and an interaction term to model (2) yields:

$$Y_{ijk} = \alpha + \beta_1 d_{ij} + \beta_2 d_{ik} + \beta_3 d_{i,83} + \beta_4 d_{i,87} + \beta_5 d_{ij,83} + \beta_6 d_{ij,87} + \beta_7 d_{ik,83} + \beta_8 d_{ik,87} + \beta X_i + \varepsilon_i \quad (3)$$

(The binary variables $d_{i,83}$ and $d_{i,87}$ take the value of 1 if the divorce or bereavement occurred in 1983 or 1987 respectively, and zero otherwise; while the remaining binary variables are interactions between these and the d_{ij} and d_{ik} indicators.) The coefficient of prime interest is β_6 , which represents the difference-in-differences between divorced and married families:

$(\bar{Y}_{10,87} - \bar{Y}_{10,85}) - (\bar{Y}_{00,87} - \bar{Y}_{00,85})$. If this coefficient is significantly different from zero the

suggestion is that those children whose parents divorced in 1987 have a different experience

than those whose parents divorced in 1985, relative to those from intact families. In a similar

vein, β_5 captures the net effect of divorce for the 1983 cohort, while β_7 and β_8 measure the

difference-in-differences of coming from a bereaved family. If β_6 is not statistically different

from zero then it might be reasonable to suggest that any differences observed between β_1 and

β_2 are substantive, and not due to the influence of this sort of unobserved influence. Parental

loss through divorce and through bereavement lead to different impacts upon children, and are

not perfectly comparable. On the other hand, a statistically significant value of β_6 might be taken as evidence of the impact of unobservables associated with the stress to which children are exposed. This would suggest that differences between the estimates of β_1 and β_2 are due to an endogeneity bias resulting from unobserved stress and conflict associated with marital break-ups.

2. Data and Measurement

Administrative data associated with the Canadian income tax system, specifically with the T1 forms that Canadians are required to submit to the tax authorities each year, are the basis for the analysis. The set of families in which the parents are married or separated and in which there is at least one 16 to 19 year old child are identified in a particular year, T , where T is either 1982, 1984, or 1986. At least one of the parents and one of the children must have filed an income tax return in year T in order for the parent-child pair to be included in the analysis.⁷ Further, the parents had to have considered themselves to be husband and wife (either married or separated) for a five year period before year T . The children are divided into one of three groups—one control group and two treatment groups—depending upon the transition the family makes between T and $T+1$: intact families if the parents remained married (representing the control group); bereaved families if one of the parents died in year $T+1$; and divorced families if the parents became divorced. The analysis is based upon a total of

⁷ See Corak and Heisz (1999) for a more detailed description of the construction of the data, how the link between parents and children is established, and an assessment of sample selection bias. With respect to the latter, they point out that the requirement that children must file an income tax return while still living at home leads to an under-representation of young adults with inferior labour market outcomes. However, they find that correcting for this by using the two-stage correction for sample selection bias proposed by Heckman does not have implications for their estimate of the degree of intergenerational income mobility.

122,488 children: 108,966 from intact families; 7,336 from bereaved families; and 6,186 from divorced families.^{8,9}

The children are then followed through the tax files in each year from T to 1995—when the youngest are 25 years of age and the oldest 32—and the outcome variables measured. There are a total of eight of these, and they are described in the first panel of Table 1. The first set of outcomes is associated with the adult labour market position of the children: average annual market income, average annual earnings, and a measure of labour market activity. Income and earnings are averaged over 1993 to 1995. This is meant to represent the permanent adult income/earnings of the child, the use of a three year average minimizing the impact of transitory fluctuations. Market income includes earnings, self-employment income, asset income, interest income, and other sources associated with the market. (All monetary values are pre-tax figures measured in 1986 constant dollars.) On average the sons in the sample have \$20,559 of income and \$18,621 in earnings, while the comparable figures for

⁸ The number of children from intact families is a one-in-ten random sample of the almost 1,010,000 individuals actually falling into this group. This selection is made simply to ease the computational burden. The samples for the other groups represent all of children who could be obtained from the T1 records in this way. While the sample sizes for the two treatment groups are much smaller than the control group, all of the samples are orders of magnitude larger than those traditionally used in studies focused on these issues. See Amato (1993) who cites a number of studies.

⁹ Given the construction of the sample, there is a possibility that the intact group is “contaminated” by some children who experienced parental divorce or death after year T+1. To continue the metaphor from experimental design, contamination of the control group will lead to an understatement of the impact of the treatment. However, given the numbers involved it is unlikely that this bias is large. For example, borrowing from Bloom *et al.* (1997), the true impact of the treatment, I^T , is given as $I^T = I^O / (1-r)$, where I^O is the observed impact and r represents the contamination rate. To develop a very rough sense of what the contamination rate might be consider the possibility of classifying individuals into the control and treatment groups on the basis of whether there was a divorce or death in the family by the time the child reached the age of twenty: that is, of following 16 year olds to year T+4, 17 year olds to year T+3, and 18 year olds to T+2. Given that the sample consists of about 1,225,000 children of which 13,522—or about 1.1%—fall into the treatment groups, then each of the four age groups contributes 0.275% to the proportion of the treatment group (assuming that each cohort is the same size and subject to the same the rate of parental divorce and death). This implies that 0.825% of the control group will experience bereavement or divorce in T+2, a further 0.55% in T+3, and a further 0.275% in T+4 as the 16 year olds finally attain the age of 20. As such, slightly less than 20,000 members of the control group will go on to experience the treatment. But the analysis is based on a one-in-ten sample, so about 2,000 individuals of 108,966 are misclassified. This implies a contamination rate of $2,000 / (108,966)$ or about 1.8%, and suggests that the observed impacts reported should be multiplied by 1.018 to obtain the true impact.

daughters are \$15,999 and \$13,896. Labour market activity is measured as the number of times an income tax return is filed between 1982 and 1995. On average both men and women filed in almost 12 of the 14 years, with a standard deviation of about 2 years.

The second set of outcomes has to do with the use of social programs:

Unemployment Insurance and Income Assistance (sometimes referred to as Social Assistance or Welfare). If there is any receipt of Unemployment Insurance benefits between 1993 and 1995 the individual is considered to have experienced a spell of insured unemployment.¹⁰

About 35% of men and 44% of women collected some benefits. Similarly, if there is receipt of Income Assistance between 1993 and 1995 the individual is considered to have relied on this program, regardless of the amount of money received. About ten percent of men and eight percent of women used Income Assistance.

The third set of outcomes has to do with marital behaviour. All of the T1 records of the children between 1983 and 1995 are examined to determine if the individual was ever married, ever separated, and ever divorced. Marital status is reported directly on the T1 form. About 48% of the sons and about 62% of daughters had claimed at one point to have been married. In Table 1 the incidences of separation and divorce—at 7.1% and about 3% for men, and 10% and about 5% for women—are expressed unconditionally. Conditional on having reported being married these figures are respectively 12.0% and 5.6% for men, and 14.3% and 7.1% for women.¹¹

¹⁰ Not all periods of unemployment are compensated with the result that this measure likely understates the true incidence of unemployment. In particular, this will be the case with any unemployment associated with school leaving.

¹¹ An earlier draft of this paper also reports results for two additional outcomes: evidence of higher education, and child-bearing while young. However, both of these variables reflect not only behavioural choices but also tax-filing behaviour. The first is based on the use of an education or tuition deduction, while the latter is based on whether a child tax exemption was claimed at any time up to and including 21 years of age. In both cases it is

As a rough check of the representativeness of these data I offer in Table 2 a comparison with survey based estimates of similar concepts. The averages derived from the administrative data are based upon weighted data, those from intact families being assigned a weight of ten. This implies that the results may differ slightly from those presented in Table 1, but that they can be compared to surveys representative of the entire population of 25 to 32 year olds. The survey based labour market outcomes are measured from the *Survey of Labour and Income Dynamics* (a longitudinal labour market survey) using the years 1993 through 1995, while the marital history outcomes are retrospective data derived from the *General Social Survey* conducted in 1995. Both surveys are based upon stratified random samples representative of the non-institutionalized Canadian population. However the estimates are subject to sampling error. The average annual market income and earnings of men in 1995 are \$19,300 and \$18,200, slightly below, but nonetheless similar, to the averages from the administrative data. The comparable figures for women are \$12,300 and \$11,700. These are somewhat lower than the tax-based estimates probably because those in the upper tail of the income distribution are under-represented in the survey data. Underlying the averages calculated from the administrative data are some very extreme values. Most notable is a woman with a market income of over \$19 million, reflecting a one year income of over \$50 million. (See Table 1.) In contrast, the maximum earnings and income reported in the survey data are about only \$85,000. In this sense the administrative data may be more accurate than the survey data.¹²

likely that the incidence of higher education and child bearing at a young age is under-reported. These results are available by consulting the working paper version at <http://www.statcan.ca>.

¹² See Corak and Heisz (1999, pp.514-19) for an elaboration of this point.

The two sets of estimates pertaining to the receipt of Unemployment Insurance are roughly the same, but the receipt of Income Assistance, particularly for women, tends to be lower in the administrative data. The survey data suggests that between 1993 and 1995 about 15% of young men and 16% of women received some Income Assistance. The estimates from the administrative data are substantially lower: about 10% for men, and 8% for women. There are two possible explanations for this. First, the sampling error for these smaller proportions may be higher, making the survey based estimates less reliable. Second, and more importantly, this may be related to the reasons for reporting Income Assistance on the T1 form. This type of income—which is not taxable—is reported only if individuals are applying for a rebate associated with the Goods and Services Tax (a consumption tax). The rebate is based on total family income, and Income Assistance benefits are used in determining qualification. As such Income Assistance will be reported by those individuals who are both aware of the rebate and apply for it. The rebate first became available, and hence Income Assistance first began appearing on the T1, in 1992. As a result the take-up rate for the rebate may have been lower in, say at least, 1993 than it would have been had the program been well-established, resulting in an understatement of the incidence of Income Assistance in the tax based data.

Finally, the outcomes associated with marital history from the tax based data all accord fairly well with the retrospective information from the survey data, especially if it is kept in mind that the latter are based on rather small sample sizes: 811 men and 979 women.

The remaining variables described in Table 1 are the controls used in the estimation of models like equations (2) and (3). These are organized into seven sets. The first set consists simply of the indicator variables for coming from one of the treatment groups: a bereaved family, and a divorced family. As discussed above in conjunction with Figure 1, these are

mutually exclusive.¹³ Six percent of children come from bereaved families and about five percent from divorced families. It should be noted that these percentages are sample proportions, not estimates of the death and divorce rates in the population. They are much higher than the actual rates because, as mentioned, the intact group are a one-in-ten sample. Further, the sample includes siblings, and therefore represents the proportion of children experiencing parental divorce or death, not the proportion of marriages.

With this in mind the implied death and divorce rates are 0.665% and 0.561% respectively. The death rate is slightly higher than the divorce rate for a number of reasons. The analysis is focused on a group of individuals with relatively long marriages (and whose children are at least in their teen years). These individuals are necessarily older (on average almost 50 years old) and have been together longer than average, implying that the death rate is higher than average while at the same time that the probability of divorce is lower. In fact, these implied death and divorce rates correspond pretty closely to the actual rates for the married population older than 45 years of age. The weighted average of the death rate for 1983, 1985, and 1987 for the married population 45 to 64 years of age is 0.629%; similarly the divorce rate over these years is 0.570%, almost exactly the rate reported here.¹⁴

¹³ The sample described in Table 1 makes no distinction between individuals from bereaved families because of paternal death and individuals suffering the death of a mother. It might be argued that the treatment groups would be more comparable if only individuals suffering a death of their father were used. The argument in favour of this approach is strongest if divorce implies that full custody of the children is always granted to the mother, and that divorce implies the complete loss of contact with the father. I am not in a position to document the extent to which this is in fact so in the sample being used, but whether bereavement was due to paternal or maternal loss is available and used to define a sample in which the children from bereaved families are those experiencing the death of a father. A total of 2,016 individuals are lost as a result of this selection rule (1,132 sons and 884 daughters). The analysis in the following section was carried through using this more restrictive sample, but the findings were not significantly different. These results and the descriptive statistics associated with these data are available upon request.

¹⁴ These rates are calculated by the author using data from Statistics Canada (1983,1985,1990a,b), and CANSIM.

The first set of controls beyond these treatment-control indicators are the child's age and age squared in 1995. These are used to control for life cycle differences in income, earnings, and marital behaviour. The second set consists of the age and age squared of the oldest parent in year T to control for life cycle differences in the probability of death and divorce. The third and fourth set relate to parental income and regular participation in the labour market: the average income earned by each of the father and the mother over the five year period before the family transition is measured (that is, using the terminology of Figure 1, years T-4 to T inclusive); and the number of times an income tax return was filed in these years by the father and by the mother.¹⁵ Parental income can be an important determinant of the capacity of parents to invest in the human capital of children. Often this capacity is phrased in terms of a model with perfect capital markets so that all that matters is the parents' permanent income (Mulligan 1997, Solon 1997). But it is conceivable that many individuals will be constrained in capital markets so that temporary fluctuations in income also matter (Mayer 1997). The number of years in which a tax return was filed by each parent is a rough approximation of the family having experienced significant changes in income over the period. In addition, it may represent significant changes in the pattern of labour force behaviour of both the father and the mother that on the one hand might be interpreted as role model effects—when viewed for example as the consequences of having a working mother—or as a measure of the amount of change and stress that the family is experiencing—as might be the case if the main breadwinner is not able to remain consistently attached to the labour

¹⁵ The income variables are defined as total income over the five years divided by five, that is regardless of the number of years an income tax return was filed. In addition, the incomes and reporting status of both parents are used throughout the five year period notwithstanding the length of time the parents were separated. Of the 6,186 individuals from divorced families 1,866 or 30.2% came from families in which the parents were separated throughout the five years previous to the divorce. About 13% came from families who were separated for each of the remaining possibilities: separation of 0, 1, 2, 3, or 4 years.

market. Either perspective is consistent with this also being a measure of the quantity and quality of time that parents have to invest in their children. The next set of controls is the industry of employment of each parent in the year before the transition is measured (1982, 1984, or 1986). The major reason for using these variables is to control for the fact that the probability of death may be correlated with industry of employment. Those working in construction and the primary industries face a greater risk of on-the-job mortality than average, while those in the service sector face a lower risk.¹⁶ The final set of controls are indicators for the region of residence since labour market conditions and some aspects of divorce and family law vary between provinces. (Except for the larger provinces—Ontario and Quebec—these are simply provincial indicators.)

3. Results

a) Difference-in-Differences

The estimates associated with model (1) are presented in Table 3 for both men and women. These are simply the mean values of the variables of interest (presented in columns (1), (2), and (3)), differences in these means (columns (4) and (5)), and the difference-in-differences between the two treatment groups (in columns (6)). For example, the results suggest that the average annual income of men from intact families is \$20,769, while the income of their counterparts in bereaved and divorced families is lower at respectively \$19,790 and \$17,721. Similarly, women from intact, bereaved, and divorced backgrounds

¹⁶ These variables are not, however, simply industry dummy variables because some parents worked in more than one job and hence possibly in more than one industry during the year. In cases where the parent held two or more jobs in different industries each of the relevant industry indicators are used but weighted by the fraction of total earnings obtained in that industry. As such these variables are defined only for individuals reporting a positive amount of earnings: the self-employed and those not active in the labour market are assigned a value of zero for each indicator.

obtain on average \$16,148, \$15,363, and \$14,185 in annual income. In general the findings in columns (4) and (5) imply that parental loss leads to inferior outcomes. With respect to the labour market outcomes, the incomes, earnings, and labour market activity of all groups experiencing parental loss are lower than those from intact families. The exceptions to this are the earnings and activity of women from bereaved families.¹⁷ In fact, men from divorced families obtain about 14% less income than those from intact families and earn about 12% less. The comparable figures for women are lower but, at –12% and –9%, still substantial. These patterns are mirrored in the rate at which income tax returns are filed: men from both treatment groups have a lower rate of filing, but particularly those with divorced backgrounds. Only women whose parents divorced have a lower rate of filing. The results dealing with the incidence of insured unemployment are more mixed, with only men from divorced families showing a greater prevalence to have received UI benefits than those from intact families. Both treatment groups regardless of gender display greater reliance on Income Assistance. Finally, parental loss in general seems to be associated with a lower likelihood of marriage, and greater marital instability (conditional on having been married).

This being said it is also clear from the difference-in-differences presented in columns (6) of the table that on average individuals from divorced families fare worse than those from bereaved families. Incomes and earnings are more than \$1,000 lower, and as much as \$2,000 lower in the case of the incomes of men. A similar result applies for all of the other outcomes. Men whose parents divorced are 3.6% more likely to rely on Income Assistance

¹⁷ This might also quite reasonably apply to the incomes of women from bereaved families. While the p-value for the t-test is less than 5%, that associated with the Wilcoxon test is almost 11%. The latter test is a distribution free test robust to outliers. As such it may be the more appropriate test for judging the statistical differences in incomes and earnings, particularly in the case of the incomes of women given the extreme data point discussed earlier in conjunction with Table 1.

than those who lost a parent through death; women in similar circumstances are 4.2% more likely. Even more significantly, the probability of having married is about 7% lower for both men and women whose parents' divorced than it is for those from bereaved backgrounds. Likewise the conditional probabilities of separation and divorce are also higher. And, at least in the case of women, there is no significant difference in the probability of separation or divorce conditional on marriage between the intact and bereaved groups, while those from the divorced group are more likely to experience marital instability.

b) Difference-in-Differences with Controls

The robustness of these findings to the inclusion of controls for background characteristics is examined in Table 4. Different estimation techniques are used according to the nature of the dependent variable. For each of the eight outcomes the table reports the coefficient estimates associated with being in the treatment groups, and the p-value for a test of equality between them. Seven models are estimated for each gender and outcome. A successively larger set of controls is included as one moves from column (1) of the table through to column (7). The last panel of the table indicates the other variables included in each of the models.

The results in columns (1) of Panels 1 and 2—for income and earnings respectively—repeat the findings given in the first two panels of Table 3: parental divorce is associated with significantly lower child incomes and earnings, and the effect is statistically different from that for the bereaved group. However, in general these differences are much diminished or eliminated entirely by the use of additional controls. With the full set of background variables there is no difference between the divorced and bereaved group, and a negative effect of parental divorce is revealed only in the incomes, and possibly the earnings, of men. In this

case parental loss, regardless of reason, implies on average an income of about \$620 to \$640 lower, which amounts to only about three percent.

In the case of women, the addition of child and parent ages are the only other background variables required to eliminate the divorced-bereaved differences in incomes and earnings. This happens in the models for men once parental labour market activity and parental incomes are included. The full regression results reveal that a decrease in father's labour market activity of one year is associated with about a \$750 decrease in the son's adult income and earnings. Conversely decreases in the mother's activity by one year may actually increase adult income and earnings by about a small amount (\$100 or less). For daughters these variables, including parental income levels, are not statistically significant, but once they are included the bereaved and divorced coefficients become statistically insignificant from zero.¹⁸ The results associated with labour market activity echo these conclusions. These are presented in panel 3 as the relative incidence rates from a Poisson model.¹⁹ Men suffering parental loss tend to be slightly less active in the labour market, women display no difference across familial types.

There does not seem to be any statistically different pattern in the incidence of insured unemployment between people from intact, bereaved, or divorced families, but a difference in reliance on Income Assistance persists regardless of the set of controls included: those of both genders experiencing parental loss being more likely to rely on the program by about the same degree. In this case, the logit coefficient of the divorced group falls by about

¹⁸ The estimations in panels 1 and 2 were also performed using median regressions, which are robust to outliers, and using both the full sample and a subset that excludes those experiencing maternal deaths. The results led to essentially the same conclusions.

¹⁹ The estimation controls for the number of years that individuals could have filed a tax return: either the number of years since they turned 16, or the number of years observed if the individual was older than 16 in the first year of observation (that is year T).

two-thirds and becomes statistically indistinguishable from the bereaved coefficient once parental income is controlled. It seems to be about 0.2 for both men and women. To put this in perspective a coefficient of this magnitude would raise the probability of a male receiving Income Assistance by about 1.5 percentage points for a reference case defined around the mean parental income levels (from 7.1 to about 8.6%).²⁰

The results associated with the remaining outcomes, dealing with marital behaviour, are different. Those in the divorced group are much less likely to have claimed to have been married at some point, while the members of the bereaved group are no different than those from intact families. This pattern also holds with regard to the conditional probability of separation and divorce: given marriage, individuals from a divorced background are more likely to separate or divorce and the introduction of control variables does not alter this effect very much. The magnitude of the effect of parental divorce on the child's probability of marriage is significant. For example, the estimated probability that a son with reference case characteristics will marry is about 50%, but about 43% for someone from a divorced family.²¹

c) Difference-in-Differences in a Before and After Design

An assessment of whether unobservables associated with parental conflict might influence these results is offered by implementing the before-after design described by equation (3). Table 5 offers a summary of the estimation results obtained from this model for each of the eight outcomes. The p-values associated with t-tests of significance of the

²⁰ The reference case also assumes that the child is 29 in 1995, the eldest parent 49 in year T, and that both parents filed income tax returns for each of the five years prior to the transition year (T+1). (These are the modal values.)

²¹ I also estimated Cox proportional hazard models of the age at first marriage, treating individuals who had not married by 1995 as censored. These models confirm the logit results. Once parental age was controlled for the baseline hazard between bereaved and intact individuals was not statistically different. However, individuals

interaction term for divorce in 1987, β_6 of equation (3), are presented for the simplest model with no controls and for the model with the full set of controls (that is models (1) and (7) in Table 3).²² Results from a pooled sample of both men and women is also offered, but the larger sample size does not lead to more precise estimates. The general impression is that the impact of parental divorce after the introduction of the new legislation is no different than just before. The major exception to this finding concerns the separation experience of women. Regardless of the set of background variables included women are less likely to have experienced a separation (conditional on having claimed to be married) if their parents divorced in 1987 than if they had divorced in 1985. In fact this also holds for women whose parents divorced in 1983, before the public discussion of the legislative changes, but the former effect is stronger. (In the full model the logit coefficients are -0.403 and -0.342 for respectively the 1987 and 1983 interaction terms.) Furthermore, the hypothesis that $\beta_6 - \beta_7 = 0$, that the 1987 interaction terms associated with divorce and bereavement are the same, can be rejected with a p-value of 9.1%.²³ Too much should not, perhaps, be made of this one finding because the chances women will divorce are not influenced by the timing of their parents' divorce. It should be underscored that the indicators for divorce and bereavement continue to display the same patterns revealed in Table 3 for all of the models. It is whether this familial transition occurred before or after the legislative changes that makes in general no difference.

from divorced backgrounds always had much lower hazard ratios: more than 20% lower in model (1) and about 16 to 18% lower in model (7).

²² The estimation was performed using all of the specifications presented in Table 3. The choice of models makes no difference to the conclusions. The full results are available upon request.

²³ The interaction term associated with the incidence of UI receipt is also significant for women across all the models estimated. However, its sign runs counter to what would be expected: women whose parents divorced in 1987 are more likely to receive UI as adults than their counterparts whose parents divorced in 1985.

4. Conclusion

The objective of the research summarized in this paper is to estimate the “true” impact of divorce on the capacity of children to become self-reliant adults. The approach adopted attempts to isolate the causal role of divorce by using a quasi-experimental design with multiple treatment groups, and is based upon the assumption that parental loss through death is more exogenous than parental divorce. The adult labour market outcomes, use of income transfer programs, and marital behaviour of adolescents from intact, bereaved, and divorced families are examined. The outcomes associated with individuals from bereaved backgrounds is taken to represent the impact of parental loss, and any difference relative to those from divorced backgrounds represents the consequences of an endogeneity bias.

An examination of raw differences between these groups and between them and individuals from intact families implies that parental loss leads to inferior outcomes across a wide range of economic and social measures. It also implies that coming from a divorced family is even more detrimental than from a bereaved background. However, comparisons of this sort overstate the impact of divorce. Difference-in-differences methods with controls imply that taking parental income and attachment to the labour market into account eliminates differences between those from divorced and bereaved backgrounds for a host of labour market outcomes. In many cases the difference between these groups and individuals from intact families is also eliminated. That is to say it would appear that with respect to labour market outcomes the causal impact of divorce is relatively mild or insignificant. The incomes and earnings of men suffer mildly—by about three percent—but incomes and earnings of women are the same regardless of familial background. However, individuals with bereaved and divorced family backgrounds are more likely to rely on Income Assistance (though not on Unemployment Insurance).

The major consequences of parental divorce are on the social behaviour, namely the marital behaviour, of children. As such the results are in accord with the findings by Lang and Zagorsky (1999) with U.S. data, LeBourdais and Marcil-Gratton (1998) with Canadian data, and Kiernan (1997) with British data. Parental divorce has a significant negative effect on the likelihood that children will marry. Not only do children whose parents divorced put off marriage relative to children from intact families, but once married they are more likely to suffer separation or divorce. Children from bereaved families, on the other hand, are no different in their marital behaviour than those from intact families. It is reasonable to suggest that at least for this set of outcomes experiencing parental loss through divorce and through bereavement are not the same thing. In particular, attitudes to familial life and the importance of marriage may not be changed by the loss of a parent through death, while witnessing the divorce of one's parents may lead children to think of marriage as a much more riskier living arrangement. It is not likely that these bereaved-divorced differences reflect the influence of unobservables, notably the exposure to stress and conflict to which children of divorcing parents may be exposed. An analysis of children whose parents experienced divorce before and after a liberalization of the Canadian Divorce Law designed to reduce the adversarial nature of divorce suggests that it did not influence the chances that children will experience marital instability in their turn. Since the quantity and quality of parental time investments in children is expected to be superior under the new regime this suggests that the results are not influenced by unobservables of this kind.

Even so, to understand the long-term implications of divorce it is important to appreciate developments in the family before the divorce actually takes place. Parental income and labour market behaviour are the crucial background variables that need to be controlled for, and they might in part be interpreted as proxies for the stress the family may be under and

the quantity of time parents invest in children. But if this is so, the results suggest that it is not divorce *per se* that is important in determining the outcomes of children, but rather the quality of the human and social capital available to them in their formative years.

There are a number of caveats associated with the analysis. First, the focus is on the effect of divorce on teenagers, not on young children. It may be that the impact of parental loss, especially with respect to cognitive development, may be greater for children at younger ages. Nevertheless, the teen years are an important period in which human capital and marital decisions are being made. Second, it may be that the impact of divorce has non linear patterns affecting individuals at different points in the income distribution differently. The analysis has focused almost exclusively on average effects. It might be reasonable to suggest that the impact of parental loss is greater on children from lower income families since these families will have fewer resources available to compensate for the loss of a parent. These remain avenues for future research.

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Figure 1

DIVORCE RATE IN CANADA: 1981 TO 1995
(Rate per 100,000 Legally Married Couples)



Source: Gentleman and Park (1997, table 1).

Table 1

DESCRIPTIVE STATISTICS

Variable	Men				Women			
	Mean	Standard Deviation	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum
CHILD OUTCOMES								
Market Income ('000s \$)	20.559	16.191	-79.654	451.598	15.999	85.549	-24.488	19,432.380
Earnings ('000s \$)	18.621	15.112	0	504.241	13.896	11.149	0	163.495
Labour Market Activity (years)	11.614	2.217	1	14	11.816	2.006	1	14
Unemployment Insurance	0.354		0	1	0.442		0	1
Income Assistance	0.102		0	1	0.084		0	1
Ever Married	0.475		0	1	0.620		0	1
Ever Separated	0.071		0	1	0.101		0	1
Ever Divorced	0.030		0	1	0.048		0	1
FAMILY BACKGROUND								
Bereaved	0.060		0	1	0.060		0	1
Divorced	0.050		0	1	0.052		0	1
OTHER CONTROLS								
Child's Age in 1995 (decades)	2.916	0.198	2.5	3.2	2.918	0.196	2.5	3.2
Child's Age Squared	0.039	0.039	0.000	0.160	0.039	0.039	0.000	0.160
Parental Age (decades)	4.865	0.663	3.100	8.800	4.895	0.662	3.100	8.300
Parental Age Squared	0.440	0.646	0.000	15.210	0.438	0.657	0.000	11.560
Father's Average Income ('000s)	34.659	40.093	-101.234	4,646.872	35.778	43.927	-88.232	3,178.663
Mother's Average Income ('000s)	10.216	14.056	-43.458	1,079.372	10.904	12.914	-12.482	545.002
Father's Labour Market Activity	4.666	1.162	0	5	4.651	1.196	0	5
Mother's Labour Market Activity	4.228	1.699	0	5	4.270	1.654	0	5
Father's Industry of Employment								
Primary	0.037		0	1	0.034		0	1
Manufacturing	0.194		0	1	0.192		0	1
Construction	0.076		0	1	0.071		0	1
Transportation	0.083		0	1	0.084		0	1
Trade	0.114		0	1	0.115		0	1
Fire	0.060		0	1	0.063		0	1
Government	0.169		0	1	0.174		0	1
Services	0.043		0	1	0.042		0	1
Unclassified	0.001		0	1	0.001		0	1
Mother's Industry of Employment								
Primary	0.016		0	1	0.013		0	1
Manufacturing	0.066		0	1	0.068		0	1
Construction	0.013		0	1	0.012		0	1
Transportation	0.015		0	1	0.015		0	1
Trade	0.096		0	1	0.098		0	1
Fire	0.048		0	1	0.054		0	1
Government	0.139		0	1	0.140		0	1
Services	0.057		0	1	0.057		0	1
Unclassified	0.001		0	1	0.001		0	1

(continued)

Table 1 (concluded)

DESCRIPTIVE STATISTICS

Variable	Men				Women			
	Mean	Standard Deviation	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum
Newfoundland	0.025		0	1	0.020		0	1
Prince Edward Island	0.006		0	1	0.006		0	1
Nova Scotia	0.033		0	1	0.032		0	1
New Brunswick	0.030		0	1	0.030		0	1
Eastern Quebec	0.061		0	1	0.051		0	1
Montreal	0.063		0	1	0.069		0	1
Western Quebec	0.089		0	1	0.077		0	1
Eastern Ontario	0.054		0	1	0.058		0	1
Central Ontario	0.115		0	1	0.118		0	1
Toronto	0.080		0	1	0.090		0	1
Southern Ontario	0.085		0	1	0.084		0	1
Northern Ontario	0.033		0	1	0.034		0	1
Manitoba	0.045		0	1	0.047		0	1
Saskatchewan	0.044		0	1	0.037		0	1
Alberta	0.093		0	1	0.095		0	1
British Columbia	0.087		0	1	0.091		0	1
Yukon or Northwest Territories	0.057		0	1	0.060		0	1
Number of Observations		69,815				52,673		

Source: Calculations by Author from Administrative Data

See text for variable definitions. All dollar figures are expressed in thousands of 1986 dollars using the CPI as the deflator. Child's age squared and Parental Age Squared are based upon the deviations of age from the mean value.

Table 2

A COMPARISON OF CHILD OUTCOMES FROM ADMINISTRATIVE AND SURVEY DATA

	Men		Women	
	Administrative	Survey	Administrative	Survey
Average Market Income	\$ 20,746	\$ 19,300	\$ 16,131	\$ 12,300
Average Earnings	\$ 18,776	\$ 18,200	\$ 13,958	\$ 11,700
Unemployment Insurance	35.3	38.3	44.3	41.8
Income Assistance	9.7	14.7	8.0	16.1
Ever Married	48.0	44.6	62.5	60.5
Ever Separated	5.6	4.8	8.8	10.3
Ever Divorced	2.7	2.9	4.4	6.8

Note: Market Income and Earnings are expressed in 1986 dollars. All other data are estimates of population proportions. Derivations from the administrative data rely on the samples described in Table 1, but with individuals from intact families being assigned a weight of 10. The survey based estimates for Market Income, Earnings, Unemployment Insurance, and Income Assistance are derived by the author from the *Survey of Labour and Income Dynamics* using weighted data on about 2,300 men and a similar number of women (those 25 to 32 years of age in 1995). The survey estimates for Ever Married, Ever Separated, or Ever Divorced are estimates as of 1995 derived by the author from Cycle 10 of the *General Social Survey* using weighted data on 811 men and 979 women 25 to 32 years of age.

Table 3
MULTIPLE TREATMENT GROUPS: DIFFERENCES, AND DIFFERENCE-IN-DIFFERENCES

	Men						Women					
	Family Type			Differences		Difference in Differences	Family Type			Differences		Difference in Differences
	Intact (1)	Bereaved (2)	Divorced (3)	(2)-(1) (4)	(3)-(1) (5)	(5)-(4) (6)	Intact (1)	Bereaved (2)	Divorced (3)	(2)-(1) (4)	(3)-(1) (5)	(5)-(4) (6)
1 INCOME												
mean	20,769	19,790	17,721	-979	-3,048	-2,069	16,148	15,363	14,185	-785	-1,963	-1,177
standard deviation / error	16,234	16,953	14,067	271	248	367	90,662	11,992	13,012	470	488	678
p-value, t-test				0.000	0.000	0.000				0.048	0.000	
p-value, Wilcoxon test				0.000	0.000					0.109	0.000	
2 EARNINGS												
mean	18,795	17,720	16,575	-1,075	-2,220	-1,145	13,967	13,813	12,771	-153	-1,196	-1,042
standard deviation / error	15,180	15,148	13,597	242	239	340	11,166	10,802	11,204	199	221	297
p-value, t-test				0.000	0.000	0.000				0.220	0.000	0.000
p-value, Wilcoxon test				0.000	0.000					0.381	0.000	
3 LABOUR MARKET ACTIVITY												
Mean Number of Years Taxes Filed	9.46	9.39	8.91	-0.077	-0.550	-0.473	9.58	9.59	9.34	0.016	-0.240	-0.256
standard deviation / error	1.74	1.86	2.05	0.030	0.036	0.046	1.58	1.61	1.70	0.030	0.033	0.045
p-value, t-test				0.005	0.000					0.708	0.000	
4 UI												
Proportion receiving	0.353	0.360	0.374	0.007	0.021	0.014	0.443	0.436	0.431	-0.007	-0.013	-0.005
p-value, proportions test				0.171	0.006					0.215	0.101	
5 INCOME ASSISTANCE												
Proportion receiving	0.097	0.128	0.164	0.032	0.068	0.036	0.079	0.099	0.141	0.020	0.062	0.042
p-value, proportions test				0.000	0.000					0.000	0.000	
6 EVER MARRIED												
Proportion	0.481	0.463	0.398	-0.017	-0.083	-0.066	0.626	0.606	0.536	-0.020	-0.090	-0.070
p-value, proportions test				0.016	0.000					0.014	0.000	
7 EVER SEPARATED*												
Proportion	0.117	0.136	0.165	0.019	0.047	0.029	0.140	0.147	0.195	0.007	0.055	0.048
p-value, proportions test				0.008	0.000					0.205	0.000	

8 EVER DIVORCED*												
Proportion	0.055	0.059	0.080	0.003	0.025	0.022	0.070	0.074	0.100	0.005	0.031	0.026
p-value, proportions test				0.278	0.000					0.217	0.000	
Number of Observations	62,180	4,166	3,469				46,786	3,170	2,717			

* Conditional on having claimed to be married. The number of observations for men are: intact – 29,886; bereaved – 1,930; divorced – 1,370. The number of observations for women are: intact – 29,265; bereaved – 1,920; divorced – 1,455.

In columns (4) and (5) the p-values are for a one-sided alternative, in columns (6) they are for two sided alternative.

Table 4

DIFFERENCE – IN – DIFFERENCES WITH CONTROLS

Child Outcomes	Sons							Daughters						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Adult Average Income	(Least Squares Regression Coefficients)							(Least Squares Regression Coefficients)						
Bereaved	-0.979	-1.312	-1.153	-0.846	-0.693	-0.641	-0.637	-0.785	-0.906	-0.855	2.981	1.980	1.768	1.594
P-value for t test	0.000	0.000	0.000	0.003	0.013	0.019	0.019	0.095	0.067	0.018	0.299	0.312	0.308	0.314
Divorced	-3.048	-2.963	-2.848	-1.703	-0.487	-0.453	-0.620	-1.963	-1.924	-1.384	7.344	-1.660	-1.927	-1.533
P-value for t test	0.000	0.000	0.000	0.000	0.100	0.125	0.039	0.000	0.000	0.006	0.284	0.327	0.316	0.330
P-value for F test of Equality	0.000	0.000	0.000	0.022	0.589	0.621	0.963	0.000	0.000	0.150	0.282	0.308	0.303	0.307
R-squared	0.002	0.026	0.026	0.059	0.060	0.063	0.067	0.000	0.002	0.000	0.074	0.075	0.077	0.078
2. Adult Average Earnings	(Least Squares Regression Coefficients)							(Least Squares Regression Coefficients)						
Bereaved	-1.075	-1.365	-1.109	-0.941	-0.766	-0.646	-0.607	-0.153	-0.224	-0.336	0.120	-0.083	-0.018	0.002
P-value for t test	0.000	0.000	0.000	0.000	0.002	0.009	0.013	0.440	0.259	0.094	0.551	0.679	0.928	0.994
Divorced	-2.220	-2.144	-2.154	-1.487	-0.061	0.014	-0.191	-1.196	-1.168	-0.663	-0.326	0.118	0.133	0.120
P-value for t test	0.000	0.000	0.000	0.000	0.830	0.962	0.507	0.000	0.000	0.003	0.187	0.677	0.637	0.676
P-value for F test of Equality	0.001	0.017	0.002	0.111	0.052	0.068	0.250	0.000	0.001	0.268	0.500	0.546	0.648	0.724
R-squared	0.001	0.022	0.023	0.033	0.035	0.041	0.052	0.001	0.006	0.009	0.024	0.024	0.028	0.052
3. Number of Years Taxes were Filed	(Poisson Regression – Relative Incidence Rates)							(Poisson Regression – Relative Incidence Rates)						
Bereaved	0.986	0.983	0.985	0.985	0.989	0.989	0.988	0.997	0.996	0.997	0.997	1.000	1.001	1.000
P-value for t test	0.002	0.000	0.001	0.001	0.019	0.024	0.013	0.595	0.418	0.617	0.624	0.991	0.887	0.963
Divorced	0.948	0.948	0.948	0.948	0.982	0.983	0.979	0.979	0.978	0.976	0.976	0.997	0.998	0.994
P-value for t test	0.000	0.000	0.000	0.000	0.005	0.005	0.001	0.000	0.000	0.000	0.000	0.726	0.780	0.419
P-value for Wald test of Equality	0.000	0.000	0.000	0.000	0.390	0.373	0.236	0.015	0.022	0.007	0.007	0.773	0.747	0.476
Pseudo R-squared	0.000	0.002	0.002	0.002	0.003	0.003	0.004	0.000	0.003	0.003	0.003	0.003	0.004	0.004

4. Probability of Receiving UI		(Logit Coefficients)								(Logit Coefficients)				
Bereaved	0.032	0.050	0.065	-0.002	0.014	0.016	0.005	-0.030	-0.037	-0.009	-0.032	-0.016	-0.015	-0.031
P-value for t test	0.334	0.132	0.056	0.943	0.683	0.637	0.884	0.419	0.322	0.802	0.392	0.673	0.696	0.423
Divorced	0.092	0.088	0.028	-0.153	-0.002	0.004	-0.026	-0.052	-0.047	-0.087	-0.137	0.005	0.010	-0.011
P-value for t test	0.011	0.015	0.455	0.000	0.964	0.931	0.560	0.195	0.234	0.032	0.002	0.915	0.853	0.831
P-value for Wald test of Equality	0.212	0.427	0.444	0.003	0.765	0.817	0.566	0.680	0.839	0.152	0.062	0.726	0.691	0.757
Pseudo R-squared	0.000	0.003	0.005	0.017	0.018	0.022	0.038	0.000	0.002	0.002	0.004	0.005	0.006	0.013
5. Probability of Receiving Income Assistance		(Logit Coefficients)								(Logit Coefficients)				
Bereaved	0.319	0.333	0.341	0.244	0.235	0.238	0.218	0.249	0.263	0.307	0.201	0.203	0.206	0.200
P-value for t test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.001	0.002
Divorced	0.607	0.605	0.504	0.224	0.147	0.152	0.119	0.649	0.646	0.505	0.185	0.193	0.210	0.213
P-value for t test	0.000	0.000	0.000	0.000	0.019	0.015	0.064	0.000	0.000	0.000	0.004	0.017	0.010	0.011
P-value for Wald test of Equality	0.000	0.000	0.017	0.767	0.247	0.257	0.197	0.000	0.000	0.019	0.848	0.919	0.971	0.896
Pseudo R-squared	0.004	0.005	0.008	0.025	0.025	0.028	0.035	0.004	0.007	0.010	0.027	0.027	0.031	0.035
6. Probability of Ever having Married		(Logit Coefficients)								(Logit Coefficients)				
Bereaved	-0.070	-0.132	-0.059	-0.061	-0.042	-0.042	-0.036	-0.084	-0.122	-0.060	-0.064	-0.041	-0.041	-0.010
P-value for t test	0.030	0.000	0.079	0.070	0.215	0.211	0.298	0.026	0.001	0.124	0.100	0.302	0.296	0.803
Divorced	-0.338	-0.340	-0.450	-0.461	-0.292	-0.293	-0.269	-0.371	-0.376	-0.487	-0.489	-0.292	-0.292	-0.239
P-value for t test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P-value for Wald test of Equality	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R-squared	0.001	0.035	0.039	0.039	0.039	0.040	0.057	0.001	0.029	0.032	0.032	0.033	0.034	0.051
7. Probability of Ever Having Separated*		(Logit Coefficients)								(Logit Coefficients)				
Bereaved	0.168	0.145	0.185	0.158	0.164	0.165	0.159	0.057	0.047	0.089	0.083	0.081	0.091	0.094
P-value for t test	0.015	0.036	0.009	0.026	0.021	0.020	0.026	0.391	0.478	0.186	0.220	0.233	0.182	0.167
Divorced	0.395	0.389	0.261	0.170	0.224	0.228	0.207	0.396	0.396	0.295	0.274	0.232	0.249	0.293
P-value for t test	0.000	0.000	0.001	0.035	0.019	0.017	0.033	0.000	0.000	0.000	0.000	0.011	0.006	0.002
P-value for Wald test of Equality	0.021	0.014	0.455	0.909	0.600	0.582	0.675	0.000	0.000	0.031	0.048	0.167	0.147	0.074
Pseudo R-squared	0.001	0.009	0.012	0.014	0.014	0.015	0.019	0.001	0.005	0.007	0.007	0.008	0.011	0.013

8. Probability of Ever Having Divorced*		(Logit Coefficients)							(Logit Coefficients)						
Bereaved		0.064	0.033	0.096	0.086	0.095	0.092	0.094	0.075	0.059	0.097	0.099	0.098	0.107	0.110
P-value for t test		0.522	0.740	0.345	0.400	0.350	0.369	0.358	0.407	0.511	0.292	0.279	0.288	0.246	0.234
Divorced		0.406	0.397	0.285	0.255	0.354	0.353	0.372	0.401	0.400	0.302	0.315	0.314	0.323	0.358
P-value for t test		0.000	0.000	0.007	0.019	0.008	0.008	0.006	0.000	0.000	0.001	0.001	0.009	0.007	0.003
P-value for Wald test of Equality		0.014	0.009	0.187	0.242	0.110	0.107	0.087	0.008	0.006	0.109	0.093	0.135	0.137	0.088
Pseudo R-squared		0.001	0.012	0.014	0.015	0.015	0.017	0.019	0.001	0.011	0.012	0.012	0.012	0.015	0.018
Other Controls	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Child's Age and Age Squared		YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	
Parental Age and Age Squared			YES	YES	YES	YES	YES			YES	YES	YES	YES	YES	
Father's Average Income				YES	YES	YES	YES				YES	YES	YES	YES	
Mother's Average Income				YES	YES	YES	YES				YES	YES	YES	YES	
Number of Years Father Filed					YES	YES	YES					YES	YES	YES	
Number of Years Mother Filed					YES	YES	YES					YES	YES	YES	
Father's Industry of Employment						YES	YES						YES	YES	
Mother's Industry of Employment						YES	YES						YES	YES	
Province and Region of Residence							YES							YES	
Number of Observations = 69,815								Number of Observations = 52,673							

All models include a constant term. Standard errors are calculated using heteroscedastic robust estimators of the variance-covariance matrix

* The models of the probability of ever having separated and ever having divorced are conditional on having married, and are based on sample sizes of 33,195 men and 32,640 women.

Table 5
DIFFERENCES IN DIFFERENCES IN A BEFORE – AFTER DESIGN WITH MULTIPLE TREATMENT GROUPS

Child Outcomes	P-Value of t-test		
	Men	Women	Pooled Sample
1. No Controls – Model (1)			
Market Income	0.914	0.406	0.491
Earnings	0.765	0.733	0.970
Labour Market Activity	0.543	0.441	0.382
Income Assistance	0.470	0.758	0.462
Unemployment Insurance	0.680	0.049	0.301
Ever Married	0.303	0.377	0.956
Ever Separated	0.572	0.037	0.254
Ever Divorced	0.895	0.499	0.579
2. Complete Controls – Model (7)			
Market Income	0.870	0.195	0.424
Earnings	0.591	0.680	0.888
Labour Market Activity	0.459	0.468	0.338
Income Assistance	0.663	0.665	0.561
Unemployment Insurance	0.585	0.032	0.250
Ever Married	0.385	0.204	0.687
Ever Separated	0.593	0.040	0.278
Ever Divorced	0.930	0.497	0.619

Table entries are the p-values associated with the t-test of the coefficient β_6 of equation (3), described in the text. See Table 4 for a statement of the estimation procedures used and a list of the other controls included in the models.

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